NEBRASKA BEAVER AND MUSKRAT DAMAGE MANAGEMENT

DECISION
AND
FINDING OF NO SIGNIFICANT IMPACT

The U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service-Wildlife Services (APHIS-WS) program responds to requests for assistance from individuals, organizations and agencies experiencing damage caused by wildlife. Ordinarily, according to APHIS procedures implementing the National Environmental Policy Act (NEPA), individual wildlife damage management actions could be categorically excluded (7 CFR 372.5(c), 60 Fed. Reg. 6000-6003, 1995). To evaluate and determine if any potentially significant impacts to the human environment from Nebraska WS' planned and proposed beaver and muskrat damage management program would occur, an environmental assessment (EA) was prepared. The EA documents the need for beaver and muskrat damage management in Nebraska and assesses potential impacts of various alternatives for responding to damage problems. The EA analyzes the potential environmental and social effects for resolving beaver and muskrat damage related to the protection of agricultural and natural resources, property, and threats to public health and safety on private and public lands in Nebraska. APHIS-WS' proposed action is to continue an Integrated Wildlife Damage Management (IWDM) program to reduce beaver and muskrat damage on all land classes in Nebraska. Comments from public involvement letters were reviewed for substantial issues and alternatives which were considered in developing this Decision.

APHIS-WS is the federal program authorized and directed by Congress to reduce damage caused by wildlife (Animal Damage Control Act of March 2, 1931, as amended (46 Stat. 1486; 7 U.S.C. 426-426c) and the Rural Development, Agriculture, and Related Agencies Appropriations Act of 1988, Public Law 100-102, Dec. 27, 1987. Stat. 1329-1331 (7 U.S.C. 426(c)). Wildlife damage management is the alleviation of damage or other problems caused by or related to the presence of wildlife, and is recognized as an integral part of wildlife management (The Wildlife Society 1992). APHIS-WS uses an IWDM approach, commonly known as Integrated Pest Management (WS Directive 2.105) in which a combination of methods may be used or recommended to reduce damage. APHIS-WS wildlife damage management is not based on punishing offending animals but as one means of reducing damage and is used as part of the WS Decision Model (Slate et al. 1992, USDA 1997, WS Directive 2.201). The imminent threat of damage or loss of resources is often deemed sufficient for wildlife damage management actions to be initiated (U.S. District Court of Utah 1993). Resource owners and management agencies have requested APHIS-WS to conduct beaver and muskrat damage management to protect agricultural and natural resources, property, and wildlife in Nebraska. All Nebraska WS wildlife damage management is in compliance with relevant laws, regulations, policies, orders and procedures, including the Endangered Species Act (ESA) of 1973 and the Clean Water Act of 1977.

Nebraska has a total area of about 77,358 mi^2 (49,509,120 acres) (Nebraska Blue Book 1998-1999); in Fiscal Year (FY) 00, Nebraska WS had agreements to conduct beaver or muskrat damage management on about 113,252 acres or about 0.23% of the land area and averaged less than 0.5% of Nebraska during FY97 through FY99 (Management Information System (MIS) 1997, 1998, 1999, 2000). Nebraska contains lands under the administration of the U.S. Fish and Wildlife Service (USFWS), U.S. Forest Service (Forest Service), Bureau of Land Management (BLM), Bureau of Reclamation (BOR), U.S. Army Corps of Engineers (USACE), American Indian Tribes, Nebraska Board of Education Lands and Funds (State trust), Nebraska Game and Parks Commission (NGPC), Nebraska Department of Natural Resources (DNR), Nebraska Department of Roads (NDOR), county, municipal and private lands.

APHIS-WS consults with the Forest Service, BLM, USFWS, USACE, NGPC, Nebraska Department of Agriculture (NDA), DNR, NDOR, Nebraska Association of County Officials, Nebraska Department of Health and Human Services (HHS) and the University of Nebraska Cooperative Extension (UNCE), as appropriate, to reduce wildlife damage. The NGPC has the responsibility to manage all wildlife in Nebraska, including Federally listed T&E species and migratory birds, which is a joint responsibility with the USFWS. Memoranda of Understanding (MOUs) signed between APHIS-WS and the Forest Service, BLM, NGPC, and NDA clearly outline the responsibility, technical expertise and coordination between agencies. The MOUs with the Forest Service and BLM provide guidance for compliance with the NEPA and the basis for the interdisciplinary process used to develop the EA. A Multi-agency Team of personnel from APHIS-WS, Forest Service, BLM, USFWS, USACE, NGPC, NDA, NDOR, HHS, DNR, and UNCE were invited and convened to

refine issues and assess the impacts of APHIS-WS' proposed action and prepare objectives and identify preliminary alternatives to beaver and muskrat damage management in Nebraska. The USACE, USFWS, Forest Service, BLM, NGPC, DNR, and NDOR cooperated with Nebraska WS' to determine whether the proposed action is in compliance with relevant management plans, laws, regulations, policies, orders, and procedures.

Consistency

Wildlife damage management conducted in Nebraska will be consistent with MOUs and policies of APHIS-WS, the NGPC, NDA, NDOR, HHS, USFWS, Forest Service, BLM, USACE, and the EA. Wildlife damage management conducted on National Forest System and BLM lands in Nebraska will be consistent with MOUs and policies of APHIS-WS, the Land and Resources Management Plans for the National Forest System Lands, the Resource Management Plans for BLM lands, and the EA. The agencies may, at times, restrict damage management that concerns public safety or resource values.

The analyses in the EA demonstrate that Alternative 1: 1) best addresses the issues identified in the EA, 2) provides safeguards for public health and safety, 3) provides WS the best opportunity to reduce damage with low impacts on non-target species, 4) balances the economic effects to agricultural and natural resources and property, and 5) allows APHIS-WS to meet its obligations to the NGPC and other federal, state, county or municipal agencies or private entities.

Monitoring

The Nebraska WS program will provide the NGPC the APHIS-WS take of target and non-target animals to help insure the total statewide take (WS take in addition to sport harvest) does not adversely affect the viability of beaver or muskrat populations as determined by the NGPC. WS will also review their beaver and muskrat damage management activities annually to insure compliance with the analysis in the EA. If it is determined that new needs for action or new alternatives need to be analyzed, WS will prepare a new EA or amend this EA to ensure NEPA compliance.

Public Involvement

Due to interest in the Nebraska WS Program, the Multi-agency Team concurred that Nebraska WS include an invitation for public comment in this EA process. An invitation for public comment letter containing preliminary issues, objectives, alternatives, and a summary of the need for action was sent to 166 individuals or organizations who had identified an interest in Nebraska WS' beaver and muskrat management program. Notice of the proposed action and invitation for public involvement were placed in five newspapers with circulation throughout Nebraska with an invitation for the public to participate in the EA process. Public comments were documented from eleven letters or written comments. The responses both supported and opposed (nine supported the program and two opposed the program) the proposal or parts of the proposal. These letters were reviewed to identify additional issues, alternatives, or to redirect the objectives of the program. The pre-decisional EA was sent to those that responded to the invitation for public involvement letter and notices were published in the same five newspapers with circulation throughout Nebraska inviting comments from the public on the pre-decisional EA. One letter was received from review of the pre-decisional EA. All responses are maintained in the administrative file at the Nebraska WS State Office, P.O. Box 81866, Lincoln, Nebraska 68501-1866.

Affected Environment

The areas of the proposed action include state and interstate highways and roads, county roads, and railroads and their right-of-ways where beaver and muskrat activities could cause damage. The areas could also include property in or adjacent to subdivisions, businesses and industrial parks where beaver impound water and gnaw or fell trees. Additionally, affected areas include timberlands, croplands, and pastures that experience financial losses from beaver flooding or gnawing. The proposed action could also include private and public property where muskrat or beaver burrowing and other activities cause damage to dikes, ditches, ponds, and levees and negatively impact the recovery of T&E species.

Major Issues

The EA describes the alternatives considered and evaluated using the identified issues. The following issues were identified as important to the scope of the analysis (40 CFR 1508.25).

1. Concerns for the Nebraska WS' kill of beaver and muskrat to cause population declines, when added to other mortality.

2. Concerns about the selectivity and effectiveness of beaver and muskrat damage management.

3. Concerns about the effects of Nebraska WS' beaver and muskrat damage management on public health and safety.

Alternatives That Were Fully Evaluated

The following alternatives were developed by the Multi-agency Team to respond to the issues. Three additional alternatives were considered but not analyzed in detail. A detailed discussion of the effects of the alternatives on the issues is described in the EA; below is a summary of the alternatives and issues.

Alternative 1. No Action[1] /Proposed Action: Continue the Current Nebraska WS Program. This alternative would continue beaver and muskrat damage management based on the needs of multiple resources (agricultural and natural resources, roadways and bridges, railroad beds, property, and public health and safety). The current program is a collection of cooperative programs with federal, state and local agencies, and private individuals and associations. Alternative 1 would allow WS to continue the current program of technical and operational assistance with beaver and muskrat damage on federal, state, tribal, county and private lands under MOUs, Cooperative Agreements, and Agreements for Control. Management is directed toward localized populations, groups, and/or individual animals, depending on the circumstances. Nebraska WS has MOUs with agencies such as the Forest Service, BLM, NDA, NGPC, HHS, and UNCE to provide direction for program activities. All damage management is based on interagency relationships, which require close coordination and consultation because of overlapping authorities. Damage management programs would be implemented following consultations with the NGPC, federal agencies, or tribes, as appropriate. Alternative 1 conforms to the MOUs between APHIS-WS, the National Forest System and BLM lands and analysis of alternative 1 indicated a low level of impact to target, non-target, and T&E species.

Alternative 2. No Federal Nebraska WS Program. This alternative would terminate the federal beaver and muskrat damage management program in Nebraska. Alternative 2 was not selected because WS is charged by law and reaffirmed by a recent court decision to reduce damage caused by wildlife (Animal Damage Control Act of 1931, as amended, ; and the Rural Development, Agriculture and Related Agencies Appropriations Act of 1988, U.S. District Court of Utah 1993). Therefore, this alternative would not allow WS to meet its statutory responsibility for providing assistance or to reduce wildlife damage. Alternative 2 is also not in accordance with the MOUs between APHIS-WS, the Forest Service and BLM. Alternative 2 would not allow WS to: 1) respond to requests, 2) monitor the implementation of producer used non-lethal methods, 3) assist the NGPC or USFWS in meeting wildlife management objectives, 4) address public health and safety requests, and 5) it would leave some of the public without a means to alleviate beaver and muskrat damage.

Alternative 3. Technical Assistance Only. Under this alternative, Nebraska WS would not conduct operational beaver and muskrat damage management in Nebraska. The entire program would consist of only technical assistance and all WS operational beaver and muskrat damage management in Nebraska would be eliminated. Alternative 3 would not allow WS to: 1) respond to all requests, 2) monitor the implementation of producer used non-lethal methods, 3) assist the NGPC or USFWS in meeting wildlife management objectives, 4) address all public health and safety requests, and 5) it would leave some of the public without a means to alleviate beaver and muskrat damage.

Alternative 4. Non-lethal Beaver and Muskrat Damage Management Only. Under this alternative, Nebraska WS would only utilize non-lethal methods for the reduction of beaver or muskrat damage in Nebraska. This alternative would not allow the use of lethal methods by WS to reduce damage caused by beaver or muskrats as described under the proposed action. Alternative 4 was not selected because it would not allow WS to: 1) respond to all requests, 2) assist the

[1] The No Action Alternative was analyzed and used as a baseline for comparing the effects of the other alternatives as required by 40 CFR 1502.14(d).

NGPC or USFWS in meeting wildlife management objectives, 3) address all public health and safety requests, and 4) it would leave some of the public without a means to alleviate beaver and muskrat damage.

Alternatives Considered but not Analyzed in Detail are the Following:

Compensation for Wildlife Damage Losses. The compensation alternative would direct all Nebraska WS' program efforts and resources toward the verification of losses from beaver and muskrats and to provide monetary compensation for those losses. Nebraska WS' activities would not include any direct damage management or technical assistance.

This option is not currently available to Nebraska WS because APHIS-WS is charged by law to protect American agricultural and natural resources, property and public health and safety (Animal Damage Control Act of 1931, as amended and the Rural Development, Agriculture and Related Agencies Appropriation Act of 1988). Analysis of this alternative by USDA (1997) shows that it has many drawbacks: 1) compensation would not be practical for public health and safety problems, 2) it would require larger expenditures of money to investigate and validate all losses and to determine and administer appropriate compensation, 3) timely responses to all requests to assess and confirm losses would be difficult and many losses could not be verified, 4) compensation would give little incentive to limit losses through other management strategies, 5) not all resource managers/owners would rely completely on a compensation program and unregulated lethal control would probably continue and escalate, and 6) neither Congress or the State of Nebraska has appropriated funds for a compensation program.

Eradication or Suppression. An eradication alternative would direct all Nebraska WS' program efforts toward planned, total elimination of beaver and muskrats. Eradication of beaver and muskrats in Nebraska is not supported by Nebraska WS or NGPC. By Nebraska state statute, "*...it is the policy of this state to conserve species of wildlife for human enjoyment, for scientific purposes, and to insure their perpetuation as viable components of their ecosystems"* (Revised Statues of Nebraska (RSN §§37-432)). Other statutory policies are to preserve the state's natural resources and wildlife, and to protect wetlands (RSN §§37-401) (Defenders of Wildlife and the Center for Wildlife Law 1996). This alternative was not considered by Nebraska WS in detail because: 1) APHIS-WS is opposed to the eradication of any native wildlife species, 2) the NGPC opposes the eradication of any native Nebraska wildlife species, 3) the eradication of a native species or local population would be extremely difficult, if not impossible to accomplish, 4) an eradication program would be cost prohibitive, and 5) eradication is not acceptable to most people.

A suppression alternative would direct Nebraska WS' efforts toward managed reduction of beaver and muskrat populations or groups on a large-scale basis. To consider large-scale population suppression as a goal of the Nebraska WS program is not realistic, practical or allowable under present APHIS-WS policy. Typically, APHIS-WS activities in Nebraska are and would be conducted on a small portion of the area where beaver or muskrat damage occurs; currently, WS only conducts beaver or muskrat damage management on about 0.5% of the area of Nebraska.

Bounties. Bounties or payment of funds for killing animals suspected of causing economic losses is not supported by the NGPC (B. Morrison, NGPC, 1999 per. comm.) nor WS, and Nebraska WS does not have the authority to establish a bounty program. Bounties were not considered in detail because: 1) bounties are generally not effective in managing wildlife, 2) circumstances surrounding the take of animals are largely unregulated, 3) no process exists to prohibit taking of animals from outside the damage management area for compensation purposes, 4) bounties may increase the take of non-target animals, and 5) Nebraska WS does not have the authority to establish a bounty program.

Finding of No Significant Impact

The analysis in the EA indicates that there will not be a significant impact, individually or cumulatively, on the quality of the human environment as a result of this proposed action. I agree with this conclusion and therefore find that an EIS need not be prepared. This determination is based on the following factors:

1. Beaver and muskrat damage management, as conducted by WS in Nebraska, is not regional or national in scope.

2. The proposed action would pose minimal risk to public health and safety.

3. There are no unique characteristics such as park lands, prime farm lands, wetlands, wild and scenic areas, or ecologically critical areas that would be significantly affected.

4. The effects on the quality of the human environment are not highly controversial. Although there is some opposition to wildlife damage management, this action is not highly controversial in terms of size, nature, or effect.

5. Based on the analysis documented in the EA and the accompanying administrative file, the effects of the proposed damage management program on the human environment would not be significant. The effects of the proposed activities are not highly uncertain and do not involve unique or unknown risks.

6. The proposed action would not establish a precedent for any future action with significant effects.

7. No significant cumulative effects were identified through this assessment. The number of beaver and muskrat taken by WS, when added to the total known other take of both species, falls well within allowable harvest levels.

8. The proposed activities would not affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places, nor would they likely cause any loss or destruction of significant scientific, cultural, or historical resources.

9. An informal consultation with the USFWS confirmed that the proposed action would not likely adversely affect any T&E species.

10. The proposed action would be in compliance with all federal, state, and local laws imposed for the protection of the environment.

Decision and Rationale

I have carefully reviewed the EA and the input from the public involvement process. I believe that the issues identified in the EA are best addressed by selecting Alternative 1 (Continue the Current Nebraska WS Program - No Action/Proposed Alternative) and applying the associated mitigation and monitoring measures discussed in Chapter 3 of the EA. Alternative 1 would provide the greatest effectiveness and selectivity of methods available, the best cost-effectiveness, and has the potential to even further reduce the current low level of risk to the public, pets, and T&E species. WS will continue to use currently authorized wildlife damage management methods in compliance with all the applicable mitigation measures listed in Chapter 3 of the EA. I have also adopted the Pre-Decisional Nebraska Beaver and Muskrat Damage Management EA along with Appendix A of the Decision document as the final. Most comments identified from public involvement were minor and did not change the analysis.

For additional information regarding this decision, contact James Luchsinger, USDA-APHIS-WS, P.O. Box 81866, Lincoln, Nebraska 68501-1866, telephone (402) 434-2340.

Michael V. Worthen, Regional Director
APHIS-ADC Western Region

4-26-01
Date

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U.S. District Court of Utah, 1993. Civil No. 92-C-0052A, January 1993.

WS Directive 2.105. The WS Integrated Wildlife Damage Management Program

WS Directive 2.201. ADC Decision Model

APPENDIX A

Response to Comments
to the
Pre-Decisional Environmental Assessment

NEBRASKA BEAVER AND MUSKRAT DAMAGE MANAGEMENT

NEPA requires that proper consideration be given to all reasonable points of view, particularly as they may relate to the issues being considered. In this light, it is important to consider and address concerns or criticisms that may arise. Appendix A of the Decision document is a summary of comments, criticisms and concerns received from review of the pre-decisional EA with the corresponding WS responses. See Appendix A of the EA for a more complete *"Literature Cited"* and Chapter 5 for the list of preparers, consultants and reviewers.

Issue 1: ***What Damage Triggers Specific Activities***

Program Response: This comment highlights the sometimes differing interests and needs of the public as they relate to wildlife and wildlife damage management and the resulting position that wildlife management agencies find themselves. WS uses the Decision Model (Slate et al. 1992) discussed in Chapter 3, pages 3-5, to determine an appropriate strategy for each damage management action, and it is program policy to aid each requester. If damage management efforts are not initiated soon after a problem is detected, losses may escalate to excessive levels, or in the case of human health and safety, people may be injured or killed before the problem is resolved.

In the Southern Utah Wilderness Alliance, et al. vs. Hugh Thompson, Forest Supervisor for the Dixie National Forest, et al., the United States District Court of Utah denied plaintiffs' motion for preliminary injunctions. In part, the court found that a forest supervisor need only show that damage is probable to establish a need for wildlife damage management (U.S. District Court of Utah 1993).

Issue 2: ***Increase Public Educational Outreach Efforts***

Program Response: Beaver play an important ecological role, creating valuable wetlands and wildlife habitat, as described in Section 1.2.2 of the EA. WS works to educate the public about wildlife benefits as well as about wildlife damage management and options to resolve damage problems. Education is an important part of WS' program because wildlife damage management is about finding *"balance"* or coexistence between the needs of people and needs of wildlife (USDA 1997). As requested, WS conducts technical assistance demonstrations, presentations and consultations for property owners sustaining damage and other interested parties. The Nebraska WS Program conducted 77 and 94 beaver and muskrat technical assistance projects in FY99 and FY00, respectively. Additionally, WS provided informational leaflets; in FY99 and FY00, the Nebraska WS program provided 345 and 764 leaflets, respectively, to the public about beaver and muskrat damage management and other wildlife damage problems. Materials distributed included information about the biology, ecology, legal status and benefits provided by beaver as well as non-lethal and lethal damage management methods that may reduce damage.

Issue 3: ***Body Gripping and Leg-hold Traps are Inhumane, Especially if the Animal Drowns.***

Program Response: The WS program is also concerned about animal welfare and continuously evaluates current and new methods because of our concern for animals. WS is conducting trap research at the National Wildlife Research Center and provided grants of at least $350,000 annually since 1997 to state wildlife agencies to develop Best Management Practices for trapping wild furbearers. While it is regrettable that animals die to alleviate some damage, we believe that if an animal death must occur, then it should occur with a minimum amount of distress and pain, in as short a period of time as practical. The American Society of Mammalogists also states that, "*Field methods used to sacrifice mammals should be quick, as painless as possible, and compatible with ... the size and*

behavior of the species of mammals under investigation." (Baker et al. 1987).

Body-Gripping Traps

The American Veterinary Medical Association (AVMA) states, *"Kill traps are practical and effective for animal collection when used in a manner that minimizes the potential for attraction and collection of non-target species"* (Andrews et al. 1993). It appears the AVMA is not objecting to the use of kill traps. In addition, the American Society of Mammalogists recommends using kill traps for medium-sized animals in field investigations (Baker et al. 1987). Also, body-gripping traps have passed the International Humane Trapping Standards for beaver and muskrat (Fur Institute of Canada 2000).

One basic problem associated with animal traps is a lack of defining *"humaneness"* as it relates to animal cruelty (Proulx and Barrett 1991). The definition of humaneness varies between people and cultures (Section 2.2.2 of the EA).

Proulx (1999) reported on state-of-the-art trap technology on the basis of the most stringent animal welfare performance criteria used to date. These criteria established that animals are rendered irreversibly unconscious in < 3 minutes; this standard was initially set for 10-minutes before being reduced to 3 minutes (Federal Provincial Committee for Humane Trapping (FPCHT) 1981). However, this later standard did not consider human safety. Initially, conibear traps were classified as state-of-the-art trapping devices and later were judged to have failed state-of-the art trapping device standards (Proulx 1999). Novak (1981) found when the striking bars of 330 conibear traps were bent inward, the time to death for beaver was 7-9 minutes. However, this modification leaves no space between the striking bars. Proulx et al. (1995) modified 330 conibear traps by welding clamping bars to the striking bars. This results in a trap of similar appearance as Novak (1981) with bent jaws. A trap modified with clamping bars strike with 20% more force than a standard 330 conibear trap. Since people using the conibear trap occasionally have traps close on their hands, the full force of the trap would strike the hand, and most likely cause injury. We consider this modification, while more beneficial for animal welfare considerations, a detriment to human safety.

In May 2000, the Canadian government determined standard and modified 330 Conibear traps met the Agreement on International Humane Trapping Standards (Fur Institute of Canada 2000) for beaver. They also determined that leg-hold traps with a submersion system, 110 Conibear traps in water, and 120 Conibear traps on land meet the Agreement on International Humane Trapping Standards (Fur Institute of Canada 2000).

In summary, the Canadian government has determined that standard and modified 330 Conibear traps, 110 and 120 Conibear traps, and leg-hold traps on submersion systems met international humane trapping standards. In addition, the American Society of Mammologists recommended kill traps for medium-sized animals and the AVMA is not opposed to kill traps for wildlife.

Drowning as a Form of Euthanasia

A commentor opposed drowning of beaver and muskrats and considered it inhumane and not euthanasia. There is considerable debate and disagreement among animal activists, veterinarians, wildlife professionals, fur trappers, and nuisance wildlife control specialists on this issue. The Nebraska WS program rarely uses drowning sets when capturing beaver or muskrats and did not captured any beaver in drowning sets during FY 1998 through FY 2000 and generally use drowning sets as a last resort.

The AVMA states *"... euthanasia is the act of inducing humane death in an animal"* and *"... the technique should minimize any stress and anxiety experienced by the animal prior to unconsciousness"* (Andrews et al. 1993). Carbon dioxide (CO_2) causes death in animals by hypoxemia and some animals (cats, rabbits, and swine) are distressed before death (Andrews et al. 1993). Even though these animals are distressed, the AVMA states this death is an acceptable form of euthanasia (Andrews et al. 1993). Thus, the AVMA does not preclude distress or pain

in euthanasia. In fact, the AVMA supports inducing hypoxemia related distress when necessary to reduce total distress because reducing total distress is a more humane death (Andrews et al. 1993).

The AVMA identifies drowning as an unacceptable method of euthanasia, but provides no literature citations to support this position (Andrews et al. 1993). Ludders et al. (1999) concluded drowning is not euthanasia based on animals not dying from CO_2 narcosis. They showed death during drowning is from hypoxia and anoxia and thus animals experience hypoxemia. In addition, they concluded that animals that drown are distressed because of the stress related hormones epinephrine and norepinephrine, and therefore, drowning is not euthanasia.

Gilbert and Gofton (1981) reported that after beaver were trapped and entered the water, they struggled for 2-5 minutes followed by a period of reflexive responses. Andrews et al. (1993) stated that with some techniques that induce hypoxia, some animals have reflex motor activity followed by unconsciousness that is not perceived by the animal. Gilbert and Gofton (1981) reported that the level of conscious control at this stage is unknown and that anoxia may have removed much of the sensory perception by 5-7 minutes post submersion.

Ludders et al. (1999) reported CO_2 narcosis does not occur until 95 millimeters of mercury in arterial blood is exceeded. Clausen and Ersland (1970) demonstrated that CO_2 increased in arterial blood while beaver were submersed and CO_2 was retained in the tissues. While Clausen and Ersland (1970) did measure the amounts of CO_2 in the blood of submersed beaver, they did not attempt to measure the analgesic effect to the beaver related to CO_2 buildup (Letter from V. Nettles, D.V.M., Ph.D., Southeastern Cooperative Wildlife Disease Study to W. MacCallum, MA Division of Fisheries and Wildlife, June 15, 1998).

When beaver are trapped using leg-hold traps with intent to *"drown,"* the beaver attempt to flee or exhibit a flight response. Gracely and Sternberg (1999) report that there is stress-induced analgesia resulting in reduced pain sensitivity during fight or flight responses. Environmental stressors that animals experience during flight or fight activates the same stress-induced analgesia (Gracely and Sternberg 1999).

Given the short time period of a drowning event, the possible analgesic effect of CO_2 buildup to the beaver or muskrat, the minimal pain or distress exhibited on drowning animals, the AVMA's acceptance of hypoxemia as euthanasia, the AVMA's acceptance of a minimum of pain and distress during euthanasia, the acceptance of catching and drowning muskrats approved by International Humane Trapping Standards (Fur Institute of Canada 2000), we conclude that drowning, though rarely used by Nebraska WS, is acceptable. We recognize some people will be unswayed, but conclude that drowning is an acceptable form of euthanazia.

Issue 4: WS does not have the Authority to Reduce Damage to Roads, Bridges, And Other Forms of Property

Program Response: In 1988, Congress strengthened and broadened the legislative responsibility of WS with the Rural Development, Agriculture, and Related Agencies Appropriations Act to control nuisance mammals and birds, not just animals causing livestock or agricultural related damage. This Act states, in part:

> *"That hereafter, the Secretary of Agriculture is authorized, except for urban rodent control, to conduct activities and to enter into agreements with States, local jurisdictions, individuals, and public and private agencies, organizations, and institutions in the control of nuisance mammals and birds and those mammal and bird species that are reservoirs for zoonotic diseases, and to deposit any money collected under any such agreement into the appropriation accounts that incur the costs to be available immediately and to remain available until expended for Animal Damage Control activities."*

WS conducts beaver and muskrat damage management on roads and bridges primarily to prevent flooding to the roadway and to protect human health and safety. The Rural Development, Agriculture, and Related Agencies Appropriations Act does not contain language restricting WS activities but rather, broadens WS' authority and

responsibility to cooperate with other governmental agencies and private organizations to reduce wildlife damage.

Issue 5: ***The EA Downplayed the Benefits of Beaver on Nebraska Wetlands***

Program Response: We disagree with this comment; the EA discussed the benefits of beaver in detail (Section 1.2.2 of the EA). As stated in the EA, beaver ponds create valuable wetlands that provide habitat for many species of fish and wildlife. These wetland ecosystems also function as sinks, helping to filter nutrients and reduce sedimentation, thereby maintaining the quality of nearby water systems (Hill 1982, Arner and Hepp 1989). Silt-laden waters, particularly waters carrying eroded soil from cultivated, logged, excessively grazed, farmed, mountainous, or developed areas, slow as they pass through a series of beaver ponds and the heavier particles and colloidals are able to settle out before the water flows into larger streams (Hill 1982). Aquatic and early successional plant species may become established in the newly deposited sediment, allowing conditions to become favorable for the stabilization of the flood plain by more permanent woody vegetation (Hill 1982). In addition, Woodward (1983) and Wade and Ramsey (1986) indicated that wetlands added an estimated $59.5 million to the national economy in 1991. The Minnesota Department of Natural Resources has computed a cost of $300 to replace, on average, each acre-foot of flood water storage that wetlands can provide (EPA 1995). Producing wetlands/marsh habitat through beaver management in New York was also far less costly than developing either small or large manmade marshes, assuming the quality is equal in each case (Ermer 1984).

Beaver ponds may also improve soil quality and provide improved habitat for some fish and invertebrates. The anaerobic conditions caused by beaver impoundments may result in the accumulation of ammonium, so that soil storage of inorganic nitrogen is nearly tripled by beaver impoundments during a 50 year period (Johnston 1994). Arner et al. (1969) found that the bottom soils of beaver ponds in Mississippi were generally higher in phosphate, potash, and organic matter than the bottom soils of feeder streams. Greater biomass of invertebrates and healthier fish were also found in beaver ponds than in feeder streams (Arner and DuBose 1982).

EPA (1995) claimed that wetlands can provide aesthetic and recreational opportunities for wildlife observation, nature study, hunting, fishing, trapping, wildlife photography, livestock water, and environmental education. Habitat modification by beaver, primarily dam building and tree cutting, benefit some wildlife (Medin and Clary 1991, Medin and Clary 1990, Arner and Hepp 1989, Arner and DuBose 1982, Hill 1982, Jenkins and Busher 1979). Beaver may increase habitat diversity by flooding and opening forest habitats, which results in greater interspersion of successional stages and subsequently increases the floral and faunal diversity of a habitat (Arner and Hepp 1989, Hill 1982). The creation of standing water, edge, and plant diversity, all in close proximity, results in excellent wildlife habitat (Hill 1982). The resulting wetland habitat may be beneficial to some fish, reptiles, amphibians, waterfowl, shorebirds, and furbearers such as muskrats, otter, and mink (*Mustela vison*) (Miller and Yarrow 1994, Naimen et al. 1986, Arner and DuBose 1982). When the ponds are abandoned, they progress through successional stages which improve feeding conditions for deer (*Odocoileus virginianus*), swamp rabbits (*Sylvilagus aquaticus*), and woodcock (*Philoela minor*) (Arner and DuBose 1982). In addition, beaver ponds may be beneficial to some T&E species, because the USFWS estimates that up to 43% of the T&E species rely directly or indirectly on wetlands for their survival (EPA 1995).

Waterfowl use beaver pond wetland habitats extensively (Arner and Hepp 1989, Novak 1987, Hill 1982, Arner 1964, Speake 1955). In particular, wood ducks (*Aix sponsa*), mallards (*Anas platyrhynchos*), black ducks (*Anas rubripes*), and other dabblers benefit from the increased interspersion of cover and food found in flooded beaver ponds (Arner and Hepp 1989, Novak 1987). Also, the attractiveness of a beaver pond to waterfowl varies with age and vegetation (Arner and DuBose 1982). In Mississippi, beaver ponds over three years in age were found to have developed plant communities which increased their value as nesting and brood-rearing habitat for wood ducks (Arner and DuBose 1982). Reese and Hair (1976) found that beaver pond habitats were highly attractive to a large number of birds year-round and Novak (1987) found that the value of the beaver pond habitat to waterfowl was minor when compared to other species of birds.

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Beaver are generally considered beneficial where their activities do not compete with human use of land or property (Wade and Ramsey 1986). The opinions and attitudes of individuals, communities, organizations, etc. regarding beaver vary greatly and are primarily influenced and formed by the benefits and damage directly experienced by each person or entity (Hill 1982). Property ownership, options for public and private land use, and the effects on adjacent properties or land use also impact public attitudes toward beaver (Hill 1982). In many cases, beaver damage exceeds benefits, resulting in a demand for beaver damage management. Woodward et al. (1976) found that 24% of landowners who reported beaver activity on their property indicated benefits to having beaver ponds on their land and also desired assistance with beaver pond management (Woodward et al. 1985, Lewis 1979, Hill 1976).

Issue 6: The EA did not Consider the Aesthetics of Beaver and Muskrats

Wildlife generally is regarded as providing economic, recreational, and aesthetic benefits (Decker and Goff 1987). Aesthetic benefits are the high value some people place on the beauty of nature; they appreciate the opportunity to observe animals such as beaver or muskrats in their natural environments and are opposed to any action that would remove beaver and/or muskrats from an environment where they can be appreciated. There is some concern that the proposed action or the alternatives identified in the EA would result in the loss of aesthetic benefits to the public, resource owners, or neighboring residents.

The proposed action provides relief from damage or threats to public health and safety. Nebraska WS only conducts beaver and muskrat damage management at the request of the affected home/property owner or resource manager. When beaver or muskrats cause problems and threats to human health and safety, they are sometimes removed. This may reduce or alleviate damage and in turn, could affect aesthetics. However, beaver and muskrat populations are healthy throughout the State of Nebraska and the United States and we believe that there are nearly limitless opportunities for viewing them in natural settings and native habitats. Thus, we acknowledge the aesthetics of wildlife and the value the public places on this aspect of wildlife while striving to address damage in a responsible and appropriate manner.

Issue 7: Cost of Management

NEPA does not require preparation of a specific cost-benefit analysis, and consideration of this issue is not essential to make a reasoned choice among the alternatives being considered. A cost-benefit analysis of WS' activities would show a higher cost per unit benefit as methods are restricted. For example, chemicals are cheap and very effective for certain wildlife damage management issues, yet they are not used for beaver damage management. Thus, our social value system has essentially established limits on the cost effectiveness of beaver damage management. As restrictions on the use of wildlife damage management tools and methods increase, cost-effectiveness of damage management is reduced.

The effectiveness of each alternative is based on the methods employed under that alternative. Effectiveness of the various methods may vary depending on circumstances at the time of application. Method effectiveness and/or applicability depends on factors such as weather conditions, time of year, biological and economic considerations, legal and administrative restrictions, or other factors. Thus, to implement the most cost-effective management, it is important to maintain the widest possible selection of damage management methods for use in selectively and effectively resolving beaver and muskrat damage management problems.

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